CLAIMS

What is claimed is:

1. A receiver having locking detection and frequency acquisition apparatus and a phase lock loop, the locking detection and frequency acquisition apparatus comprising:

   a comparator coupled to a locking indicator signal in the phase lock loop, a voltage level on the locking indicator signal indicating whether the phase lock loop is outside a locking range, the comparator monitoring the voltage level on the locking indicator signal and generating a pulse to close a switch when the phase lock loop is outside the locking range; and

   a multi-vibrator which continuously generates a sweeping signal, the switch coupling the sweeping signal of the multivibrator to the phase lock loop to push the phase lock loop inside the locking range.

2. The apparatus as claimed in Claim 1 wherein the sweeping signal is periodic.

3. The apparatus as claimed in Claim 2 wherein the frequency of the periodic sweeping signal is lower than the frequency of a receive signal monitored by the phase lock loop.

4. The apparatus as claimed in Claim 2 wherein the periodic sweeping signal is a triangular waveform.

5. The apparatus as claimed in Claim 2 wherein the periodic sweeping signal is a square waveform.

6. The apparatus as claimed in Claim 2 wherein the periodic sweeping signal is a sinusoidal waveform.

7. The apparatus as claimed in Claim 3 wherein the frequency of the periodic sweeping signal is at least one hundred times lower than the frequency of received frames on the receive signal.

8. The apparatus as claimed in Claim 7 wherein the period of the periodic sweeping signal is 1200 milli seconds and the period of the received signal is 10 microseconds.

9. The apparatus as claimed in Claim 1 wherein the comparator generates a plurality of pulses until the phase lock loop is within the locking range.

10. The apparatus as claimed in Claim 1 wherein the locking indicator is an output of a differential amplifier in the phase lock loop and the switch is coupled to an integrator in the phase lock loop.

11. The apparatus as claimed in Claim 9 wherein the switch includes three terminals, a first terminal of the switch coupled to the phase lock loop and a second terminal of the switch coupled to the multivibrator, the switch close signal from the comparator coupled to a third terminal of the switch.

12. The apparatus as claimed in Claim 10 wherein a second terminal of the switch is coupled to the integrator in the phase lock loop.

13. The apparatus as claimed in Claim 12 wherein the second terminal of the switch is coupled to the non-inverting input of a comparator in the integrator in the phase lock loop.

14. The apparatus as claimed in Claim 1 wherein the comparator generates the pulse on the switch close signal during a frame synchronization period in a received frame while the voltage level of the locking indicator signal is outside the locking range of the phase lock loop.

15. The apparatus as claimed in Claim 14 wherein a common mode voltage level is 2.5 volts and a voltage level in the range 2.4 - 2.6 volts on the locking indicator signal is within the locking range.

16. A method for providing locking detection and frequency acquisition for a phase lock loop in a receiver comprising:

monitoring a voltage level of a locking indicator signal in the phase lock loop;

generating a pulse to close a switch, upon detecting from the voltage level on the locking indicator signal that the phase lock loop is outside a locking range;

continuously generating a sweeping signal; and

injecting the sweeping signal into the phase lock loop while the switch is closed to push the phase lock loop inside the locking range.

17. The method as claimed in Claim 16 wherein the sweeping signal is periodic.

18. The method as claimed in Claim 17 wherein the frequency of the periodic sweeping signal is lower than the frequency of a receive signal monitored by the phase lock loop.

19. The method as claimed in Claim 18 wherein the periodic signal is a triangular waveform.

20. The method as claimed in Claim 18 wherein the periodic signal is a square waveform.

21. The method as claimed in Claim 18 wherein the periodic sweeping signal is a sinusoidal waveform.

22. The method as claimed in Claim 18 wherein the frequency of the periodic sweeping signal is at least one hundred times lower than the frequency of received frames on the receive signal.

23. The method as claimed in Claim 22 wherein the period of the periodic sweeping signal is 1200 milli seconds and the period of the received signal is 10 microseconds.

24. The method as claimed in Claim 18 wherein a plurality of pulses are generated for a plurality of received frames until the phase lock loop is within the locking range.

25. The method as claimed in Claim 18 wherein the pulse on the switch close signal is generated during a frame synchronization period in a received frame while the voltage level of the locking indicator signal is outside the locking range of the phase lock loop.

26. The method as claimed in Claim 25 wherein a common mode voltage level is 2.5 volts and a voltage level in the range 2.4 - 2.6 volts on the locking indicator signal is within the locking range.

27. A receiver having locking detection and frequency acquisition apparatus and a phase lock loop, the locking detection and frequency acquisition apparatus comprising:

a comparator coupled to a locking indicator signal in the phase lock loop, a voltage level on the locking indicator signal indicating whether the difference between the frequency of a local oscillator in the phase lock loop and the frequency of a received signal is outside a predefined locking range, the comparator monitoring the voltage level on the locking indicator signal and generating a pulse to close a switch when the phase lock loop is outside the locking range; and

a multi-vibrator which continuously generates a sweeping signal, the switch coupling the sweeping signal of the multivibrator to the phase lock loop to push the phase lock loop inside the locking range by modifying an input voltage level to the local oscillator to modify the frequency of the local oscillator.

28. A locking detection and frequency acquisition apparatus for pushing a phase lock loop into a locking range, the locking detection and frequency acquisition apparatus comprising:

a comparator coupled to a locking indicator signal in the phase lock loop, a voltage level on the locking indicator signal indicating whether the difference between the frequency of a local oscillator in the phase lock loop and the frequency of a received signal is outside the predefined locking range, the comparator monitoring the voltage level on the locking indicator signal and generating a pulse to close a switch when the phase lock loop is outside the locking range; and

a multi-vibrator which continuously generates a sweeping signal, the switch coupling the sweeping signal of the multivibrator to the phase lock loop to push the phase lock loop inside the locking range by modifying an input

voltage level to the local oscillator to modify the frequency of the local oscillator.